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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference P0888	FOR FURTHER ACTION	See Form PCT/IPEA/416
International application No. PCT/GB2004/004294	International filing date *(day/month/year)* 11.10.2004	Priority date *(day/month/year)* 21.10.2003
International Patent Classification (IPC) or national classification and IPC A62B35/04		
Applicant UNILINE SAFETY SYSTEMS LIMITED et Al.		

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 5 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
   a. ☒ *sent to the applicant and to the International Bureau)* a total of 11 sheets, as follows:
      ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
      ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
   b. ☐ *(sent to the International Bureau only)* a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

☒	Box No. I	Basis of the opinion
☐	Box No. II	Priority
☐	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
☐	Box No. IV	Lack of unity of invention
☒	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
☐	Box No. VI	Certain documents cited
☐	Box No. VII	Certain defects in the international application
☒	Box No. VIII	Certain observations on the international application

Date of submission of the demand	Date of completion of this report
23.05.2005	09.02.2006
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Neiller, F Telephone No. +49 89 2399-2685

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/GB2004/004294

Box No. I Basis of the report

1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.

   ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
   - ☐ international search (under Rules 12.3 and 23.1(b))
   - ☐ publication of the international application (under Rule 12.4)
   - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)

2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:

Description, Pages

1-3, 8-33	as originally filed
4-7	filed with telefax on 23.05.2005

Claims, Numbers

1-37	filed with telefax on 23.05.2005

Drawings, Sheets

1/15-15/15	as originally filed

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing

3. ☐ The amendments have resulted in the cancellation of:
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
   - ☐ the description, pages
   - ☐ the claims, Nos.
   - ☐ the drawings, sheets/figs
   - ☐ the sequence listing *(specify)*:
   - ☐ any table(s) related to sequence listing *(specify)*:

* *If item 4 applies, some or all of these sheets may be marked "superseded."*

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-37
	No:	Claims	
Inventive step (IS)	Yes:	Claims	1-37
	No:	Claims	
Industrial applicability (IA)	Yes:	Claims	1-37
	No:	Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (SEPARATE SHEET)

International application No.

PCT/GB2004/004294

Re Item V.

1 INDEPENDENT CLAIM 1

1.1 FR-A1-2 638 094, being considered as the closest prior art, discloses a fall arrest device according to the preamble of claim 1.

The problem to be solved by the invention was to have a fall arrest device which is able to move consistently with the user irrespective of whether he is ascending or descending, while avoiding that the device gets accidentally disconnected from the track.

In order to solve this problem, the fall arrest device of the present invention comprises a lock plate which is movable towards and away from the path of the track through the device, the lock plate including biasing means adapted to bias the plate to a position in which it co-operates with the U-shaped member to prevent the device being removed from the track.

These features are novel and the skilled person cannot derive them in an obvious manner from the cited A-documents in order to solve the problem posed.

1.2 In the light of the above, the subject-matter of claim 1 and its dependent claims is considered to meet the requirements of Article 33(2) and (3) PCT.

1.3 The industrial applicability of the device is self-evident (Article 33(4) PCT).

Re Item VIII.

1 The relevant background art disclosed in the document FR-A-2 638 094 should have been mentioned in the description.

It is therefore an object of the present invention to provide a fall arrest device which overcomes, or at least ameliorates, one or more of the above disadvantages.

According to one aspect of the present invention there is provided a fall arrest device comprising:

a U-shaped member adapted to accommodate a track of a fall arrest system;

a cam member including an actuating arm and a cam portion, the cam member being pivotably mounted on the device such that the cam portion is movable towards the U-shaped member so as to lock the track between the cam portion and an internal surface of the U-shaped member in the event of a fall;

biasing means urging the cam member in a direction away from the internal surface of the U-shaped member to a position in which the cam portion is adapted to allow the track to pass between the cam portion and the internal surface of the U-shaped member;

actuating means adapted in the event of a fall to engage with the actuating arm or the cam member and to cause the cam member to pivot against the biasing force of the biasing means such that the cam portion locks the track;

friction means adapted in use to engage with the track such that at least a predetermined minimum load is required to cause the device to move relative to the track; and

a lock plate which is movable towards and away from the path of the track through the device, the lock plate including biasing means adapted to bias the plate to a position in which it co-operates with the U-shaped member to prevent the device being removed from the track.

Two U-shaped members may be provided, the U-shaped members being spaced in the axial direction of the path of a track through the device.

The actuating arm of the cam member may be provided with guide flanges for the actuating means.

The device may include two cam members, the cam members being adapted to be actuated by movement of the actuating means in generally opposing directions.

The biasing means may comprise a torsion spring.

The biasing means may be adapted to maintain the cam member in position until a threshold load is applied thereto.

The actuating means may be pivotably mounted on the device.

Alternatively or additionally, the actuating means may be movable in a direction towards and away from the path of the track through the device. The actuating means may be movable in a direction substantially perpendicular to the path of the track.

The actuating means may include a lever adapted to engage the cam member. The lever may be slidably engaged with an arcuate slot provided in the cam member.

Alternatively or additionally, the actuating means may engage directly with the cam member.

The actuating means may be provided with an aperture for receiving fastening means for securing a user to the device. The device may include a plate extending in a plane substantially parallel to the actuating means and provided with an aperture for receiving the fastening means. Two spaced plates may be provided, one plate being positioned on either side of the actuating means.

The aperture in the plate may be curved. Moreover, the aperture may include a portion at least at one end thereof extending in a direction substantially parallel to the axial direction of the path of the track through the device.

An intermediate member may be provided, the intermediate member extending through the aperture in the actuating means and through the aperture in the or each plate, for connecting to a fastening means.

The friction means may comprise a cylindrical post, the axially extending surface of the post being adapted to engage the track. Two cylindrical posts may be provided, the posts being spaced in the axial direction of the path of the track through the device. The cylindrical posts may be in the region of opposite ends of the device.

The friction means may be movable towards and away from the path of the track.

The friction means may be adapted to exert a force on the track such that a predetermined minimum load is required to move the device relative to the track. The predetermined load may correspond to a load less than 5 kg. Alternatively or additionally, the predetermined load may correspond to a load greater than the weight of the device.

The friction means may include means biasing the friction means towards the path of the track. The biasing means may comprise a compression spring.

The friction means may comprise means, such as a release button, for (manually) moving the friction means away from the path of the track.

The lock plate may be spaced from the U-shaped member in the locking position to allow the device to pass over intermediate posts of the fall arrest system. The biasing means may comprise a torsion spring. The lock plate may include a release button for moving the lock plate in a direction away from the U-shaped member against the force of the biasing means.

According to another aspect of the present invention there is provided a fall arrest system comprising a track, an intermediate bracket and a device as hereinbefore defined, wherein the intermediate bracket is formed intermediate end portions thereof with inclined faces whereby a portion of

CLAIMS

1. A fall arrest device comprising:

a U-shaped member (3, 5) adapted to accommodate a track (7) of a fall arrest system;

a cam member (15, 17; 81, 83; 87, 89) including an actuating arm (21; 85) and a cam portion (19), the cam member being pivotably mounted on the device such that the cam portion is movable towards the U-shaped member so as to lock the track between the cam portion and an internal surface of the U-shaped member in the event of a fall;

biasing means (22) urging the cam member in a direction away from the internal surface of the U-shaped member to a position in which the cam portion is adapted to allow the track to pass between the cam portion and the internal surface of the U-shaped member;

actuating means (27; 93) adapted in the event of a fall to engage with the actuating arm or the cam member and to cause the cam member to pivot against the biasing force of the biasing means such that the cam portion locks the track; and

friction means (55) adapted in use to engage with the track such that at least a predetermined minimum load is required to cause the device to move relative to the track, characterised by

a lock plate (39) which is movable towards and away from the path of the track (7) through the device, the lock plate including biasing means (43) adapted to bias the plate to a position in which it co-operates with the U-shaped member (3, 5) to prevent the device being removed from the track.

2. A device as claimed in claim 1, characterised in that two U-shaped members (3, 5) are provided, the U-shaped members being spaced in the axial direction of the path of a track (7) through the device.

3. A device as claimed in claim 1 or 2, characterised in that the actuating arm (85) of the cam member (81, 83) is provided with guide flanges (91) for the actuating means (27).

4. A device as claimed in claim 1, 2 or 3, characterised in that the device includes two cam members (15, 17; 81, 83; 87, 89), the cam members being adapted to be actuated by movement of the actuating means (27; 93) in generally opposing directions.

5. A device as claimed in any preceding claim, characterised in that the biasing means (22) comprises a torsion spring.

6. A device as claimed in any preceding claim, characterised in that the biasing means (22) is adapted to maintain the cam member (15, 17; 81, 83; 87, 89) in position until a threshold load is applied thereto.

7. A device as claimed in any preceding claim, characterised in that the actuating means (27; 93) is pivotably mounted on the device.

8. A device as claimed in any preceding claim, characterised in that the actuating means (27; 93) is movable in a direction towards and away from the path of the track (7) through the device.

9. A device as claimed in claim 8, characterised in that the actuating means (27; 93) is movable in a direction substantially perpendicular to the path of the track (7).

10. A device as claimed in any preceding claim, characterised in that the actuating means (27; 93) includes a lever (31; 95) adapted to engage the cam member (15, 17; 87, 89).

11. A device as claimed in claim 10, characterised in that the lever (31) is slidably engaged with an arcuate slot (35) provided in the cam member (15, 17).

12. A device as claimed in any preceding claim, characterised in that the actuating means (27) engages directly with the cam member (15, 17).

13. A device as claimed in any preceding claim, characterised in that the actuating means (27; 93) is provided with an aperture (29) for receiving fastening means (63; 71) for securing a user to the device.

14. A device as claimed in claim 13, characterised in that the device includes a plate (9, 45) extending in a plane substantially parallel to the actuating means (27; 93) and provided with an aperture (11, 46) for receiving the fastening means (63; 71).

15. A device as claimed in claim 14, characterised in that two spaced plates (9, 45) are provided, one plate being positioned on either side of the actuating means (27).

16. A device as claimed in claim 14 or 15, characterised in that the aperture (11, 46) in the plate (9, 45) is curved.

17. A device as claimed in claim 16, characterised in that the aperture (11, 46) in the plate (9, 45) includes a portion at least at one end thereof extending in a direction substantially parallel to the axial direction of the path of the track (7) through the device.

18. A device as claimed in any one of claims 14 to 17, characterised in that an intermediate member (71) is provided, the intermediate member extending through the aperture (29) in the actuating means (27) and through the aperture (11, 46) in the or each plate (9, 45), for connecting to a fastening means (63).

19. A device as claimed in any preceding claim, characterised in that the friction means (55) comprises a cylindrical post, the axially extending surface of the post being adapted to engage the track (7).

20. A device as claimed in claim 19, characterised in that two cylindrical posts (55) are provided, the posts being spaced in the axial direction of the path of the track (7) through the device.

21. A device as claimed in claim 20, characterised in that the cylindrical posts (55) are in the region of opposite ends of the device.

22. A device as claimed in any preceding claim, characterised in that the friction means (55) is movable towards and away from the path of the track (7).

23. A device as claimed in any preceding claim, characterised in that the friction means (55) is adapted to exert a force on the track (7) such that a predetermined minimum load is required to move the device relative to the track.

24. A device as claimed in claim 23, characterised in that the predetermined load corresponds to a load less than 5 kg.

25. A device as claimed in claim 23 or 24, characterised in that the predetermined load corresponds to a load greater than the weight of the device.

26. A device as claimed in any preceding claim, characterised in that the friction means (55) includes means (59) biasing the friction means towards the path of the track (7).

27. A device as claimed in claim 26, characterised in that the biasing means (59) comprises a compression spring.

28. A device as claimed in any preceding claim, characterised in that the friction means (55) comprises means (61) for (manually) moving the friction means away from the path of the track (7).

29. A device as claimed in claim 28, characterised in that the means for moving the friction means (55) comprises a release button (61).

30. A device as claimed in any preceding claim, characterised in that the lock plate (39) is spaced from the U-shaped member (3, 5) in the locking position to allow the device to pass over intermediate posts of the fall arrest system.

31. A device as claimed in any preceding claim, characterised in that the biasing means (43) of the lock plate (39) comprises a torsion spring.

32. A device as claimed in any preceding claim, characterised in that the lock plate (39) includes a release button (49) for moving the lock plate in a direction away from the U-shaped member (3, 5) against the force of the biasing means (43).

33. A fall arrest system comprising a track (7), an intermediate bracket (65, 101) and a device as claimed in any preceding claim, characterised in that the intermediate

bracket (65, 101) is formed intermediate end portions thereof with inclined faces whereby a portion of the track is exposed intermediate the end portions for engagement with the friction means (55) and with the cam portion (19) of the fall arrest device.

34. A system as claimed in claim 33, characterised in that the track (7) is in the form of a cable.

35. A system as claimed in claim 33 or 34, characterised in that the intermediate bracket (101) is formed intermediate end portions thereof with inclined faces whereby a portion of the track (7) intermediate the end portions is exposed for engagement with the internal surface of the U-shaped member (3, 5) of the fall arrest device.

36. A system as claimed in claim 35, characterised in that the end portions of the intermediate bracket (101) are interconnected by means lateral connecting portions provided at each side of the track.

37. A system as claimed in claim 35 or 36, characterised in that the end portions of the intermediate bracket (101) are formed with divergent faces, one of which faces is adapted to engage the friction means (55) and the other of which faces is adapted to engage the internal surface of the U-shaped member (3, 5).